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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/038,264	01/03/2002	Seungbae Park	EN999048D	8328

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EXAMINER

GARCIA, ERNESTO

ART UNIT	PAPER NUMBER
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3679

DATE MAILED: 08/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/038,264	PARK ET AL.	
	Examiner	Art Unit	
	Ernesto Garcia	3679	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 August 2006 and 10 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-14 and 17-28 is/are pending in the application.
- 4a) Of the above claim(s) 11-14, 17-23 and 26-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 24 and 25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 2, 2006 has been entered.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Election

Claims 11-14, 17-23, and 26-28 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on July 22, 2002.

With regards to the withdrawal of claims 26-28, the claims are not readable on the elected species. Note that the microcracks form near the first and second intermetallic boundaries instead in the boundaries. See amended paragraph amended April 6, 2004 and Figure 4.

Drawings

The drawings are objected to under 37 CFR 1.83(a) because they fail to show the micro-cracking 20 at each intermetallic boundary 15 as described in the specification on the paragraph beginning on page 8, line 15.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "16" and "29" have both been used to designate the same pad. Applicants should note that the pads are the same regardless whether one is upside down or oriented in any direction.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "15" and "27" have both been used to designate the same boundary or layer in Figure 4.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended

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replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended". If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: the description of the intermetallic layer 27 being formed between solder 25 and pad 10 is not accurate on the paragraph starting on page 8, line 5, amended in September 7, 2005. Note that Figure 4 has no pad 10 to render an intermetallic layer 27 formed between solder 25 and pad 10. Further, the description that the micro-cracking 20 is at each intermetallic boundary 15 in the same paragraph referenced above is not

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accurate. According to amended Figure 4, 15' is the intermetallic boundary and not 15. Appropriate correction is required.

A substitute specification excluding the claims is required pursuant to 37 CFR 1.125(a) because the amendment filed on September 7, 2005 has a change made relative to the original specification instead of the paragraph amended on March 30, 2005. Furthermore, the location of the paragraph to be amended in the amendments filed on November 7, 2005, March 30, 2005, April 6, 2004, is not accurate with respect to the original specification. Note that the instruction either has the line number or the page number incorrect.

A substitute specification must not contain new matter. The substitute specification must be submitted with markings showing all the changes relative to the immediate prior version of the specification of record. The text of any added subject matter must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. The text of any deleted subject matter must be shown by being placed within double brackets if strike-through cannot be easily perceived. An accompanying clean version (without markings) and a statement that the substitute specification contains no new matter must also be supplied. Numbering the paragraphs of the specification of record is not considered a change that must be shown.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 24 and 25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 24, the recitations “for interconnecting an electronic chip to a substrate” recited in claim 1, “electrically and physically connected to said substrate and having a substantially planar first lower surface engaging said substrate” recited in lines 3-4, and “electrically and physically connected to said chip and having a substantially planar second upper surface engage said chip” recited in lines 6-7, are nowhere found in the original disclosure. Furthermore, an electronic chip or a substrate has not been shown in the drawings to provide such support as now claimed. This is a new matter rejection.

Regarding claim 25, the claim depends from claim 24 and therefore contains new matter.

Claims 24 and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 24, there is an inconsistency between the language in the preamble and certain portions in the body of the claim, thereby making the scope of the claims unclear. The preamble clearly indicated that the solder joint is "for interconnecting an electronic chip to a substrate". However, the body of the claim positively recites "the substrate" and "the chip", e.g., "a first metallic pad electrically and physically connected to said substrate and having a substantially planar first lower surface engaging said substrate" (lines 3-4), and "a second metallic pad electrically and physically connected to said chip and having a substantially planar second upper surface engaging said chip" (lines 6-7), which indicates that the claims are being drawn to a combination of the "solder joint" and both "the electronic chip" and "the substrate". Accordingly, is the combination or subcombination being claimed? Appropriate correction, clarification, or both is required. For purposes of examination, the examiner has considered the solder joint without the electronic chip and the substrate.

without the micro-cracks. Further, what constitutes "encounter" in line 11? Do the cracks end at the undulations?

Claim Rejections - 35 USC § 102

Claims 24 and 25, as best understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Baker et al., 4,532,681 (see marked-up attachment provided in the last Office action).

Regarding claim 24, Baker et al. disclose, in Figure 5, a solder joint comprising a first metallic pad **41**, a second metallic pad **40**, and solder **44** (see Abstract, line 3). The first metallic pad **41** has a substantially planar first lower surface **A11** and a first upper surface **A12** including first serpentine undulations **A13**. The second metallic pad **40** has a substantially second upper surface **A15** and a second lower surface **A16** including second serpentine undulations **A17** extending downwardly. The solder **44** interconnects the first upper surface **A12** with the second lower surface **A16**. Applicant is reminded that within the scope of the invention of Baker et al., Figure 5 has solder between the pads **40,41**.

Regarding claim 25, a first intermetallic boundary is formed at the connection of the solder **44** and the first upper surface **A12**. The second intermetallic boundary is formed at the connection of the solder **44** and the second lower surface **A16**.

Response to Arguments

Applicant's arguments with respect to claims 24 and 25 have been considered but are moot in view of the new grounds of rejection.

Conclusion

The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Japanese patent, JP62-292261, shows a similar solder joint.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ernesto Garcia whose telephone number is 571-282-7083. The examiner can normally be reached from 9:30-5:30. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel P. Stodola can be reached at 571-272-7087.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

E.G.

E.G.

August 4, 2006



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